

## CALCULUS II STUDENTS' DEFINITIONS OF FUNCTION: ATTENTION TO CORRESPONDENCE

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For students studying upper-level mathematics, particularly those majoring in STEM fields, having a robust concept definition of function is an essential part of their continued study of topics in advanced mathematics (e.g., Thompson & Carlson, 2017). Thompson and Carlson (2017) note that it would benefit students learning calculus to have a more developed, conceptual understanding of function; and technology can be an effective way for students to make connections between different ways of thinking about function (Dick & Hollebrands, 2011). Students' definition of function is varied, with many being misaligned with the mathematical definition (Vinner & Dreyfus, 1989). Often students rely on the use of continuous functions or think of functions only in terms of a graph or algebraic formula (e.g., Vinner & Dreyfus, 1989). Thus, it is worthwhile to give students an opportunity to reexamine their definition of function using technology, especially in a manner which does not involve graphs, or equations.

We designed an applet to challenge Calculus II students' understanding of function. Our applet (<https://ggbm.at/J3mJaU6H>) featured a vending machine design, as this allowed us to put the concept of function in a context that did not make use of numbers or other traditional algebraic language. We specifically built the machines to problematize students' understanding of function. Thus we analyzed the students' pre and post definitions to answer the following question: How do students change their definition of function after engaging with the applet?

Pre- and post-definitions were collected from 87 Calculus II students from three different universities. Definitions were coded for many characteristics including accounting for correspondence with elements of the range. Our results indicated that 33 of the 64 students (52%) who did not account for correspondence in their pre-definition did so in their post. Our poster will share full details of our analysis and associated results.

### References

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